

Operating instructions

Digital Video Sensor

EDM-40



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Dear Customer!

Thank you for your decision to use the Digital Video Sensor EDM-40 in your application.

We ask you to read thoroughly through the brief instructions, so that you can use the EDM-40 functions in an optimum way for your system.

Before installing the equipment, please read the safety instructions on page 34.

Check the included accessories for completeness:

- 1 x plug-in power supply 9 VDC, 1000mA
- 2 x mounting brackets with screws for mounting in a 19" rack
- 1x CAT5- Crossover Patch cable 2m
- 1 x 25 pin D-SUB soldering plug with cover and mounting hardware
- 1 x male / 1x female 9pin D-SUB soldering plug with cover
- 1 x CD-ROM with installation software
- 4 x self-adhesive equipment feet

Please contact your dealer directly, if any of the accessories should be missing!

1.0 Installation

1.1 PC Setup Dialog

The PC setup program for the EDM-40 video sensor uses the Windows systems 2000 /XP. The screen resolution should be set to at least 800 × 600 and the number of colors should be set to *True Color*.

To install the program from the included CD-ROM, run *Setup.exe* in the "Sensor" folder. Follow the program instructions and install the SENSOR setup in the desired folder.

After the installation has been completed, start the program *Sensor* via the standard Windows menu *Start ▶ Program Files ▶ Sensor*. The setup program for the EDM-40 will be executed.

The program can be uninstalled via the Windows control panel menu "*Software*".

1.2 EDM-40

Please connect the video signal of the video cameras to the BNC inputs 1 through 4. By using the loop-through-Video outputs please and connect the outputs to the monitors, camera switches, etc.

After connecting the power supply, the blue symbol "Power LED" lights up.

3-5 seconds after the sensor is initialized (the yellow LED is flashing) and ready for operation.

To configure the EDM-40, connect the Ethernet interface of the sensor to the LAN port of a PC or a laptop. Use the included crossover-cable for that purpose.

Important:

If you connect the DMD to a network hub/switch please use a 1:1-patch cable!

After starting the PC setup program, you can setup the EDM-40.

2.0 Technical Data

Hardware:Videosignale:

- 4 Video inputs, 1 Vp-p, 75 Ohm, with loop-through output
- Termination manually switchable

Sensor cells:

- 4 areas with over 6000 cells for each camera
- 8 scans/sec. each camera

Interfaces:

- RS232
- RS422/RS485 (galvanic separation)
- 10/100Mbit Ethernet
- 6 inputs (4x channel, global, DST-switch); passive protected
- 6x relay outputs (4x alarm, global, sabotage)
- 6 status-LEDs

Programm setup-memory:

- Firmware- and setup programming via Ethernet (RS232 optional)
- Integrated realtime clock, buffered

Housing:

- 19"-plug-in unit, 1 HE,
- Color: RAL 7035 , powder-coated

Power supply:

- External, 9-12VDC / min. 1000mA

Software:

- PC setup via Ethernet interface, storing and downloading of parameters, password protection
- Transmission of camera picture to PC-setup program for positioning of sensor areas
- 4 freely configurable sensor areas per camera with a resolution of 6480 cells
- Object recognition up to 32 objects/camera and object tracking
- Analysis with perspective settings
- Dome Tracking: When detecting an object the sensor automatically calls presets of dome cameras
- Recognition / alarm notification of sabotage events
- Misc. filter function for detection of movements and for reduction of weather-dependent influences
- Integrated week-timer with a resolution in steps of 15-minutes; 4 time zones programmable with calendar function
- Selection for day/night settings via external contact
- Logical combination of sensor areas, alarm inputs and timer
- Triggering of one relay contact per camera and individual programming of serial command sequences for each area
- Live picture transmission and display of analysis data on PC setup program.

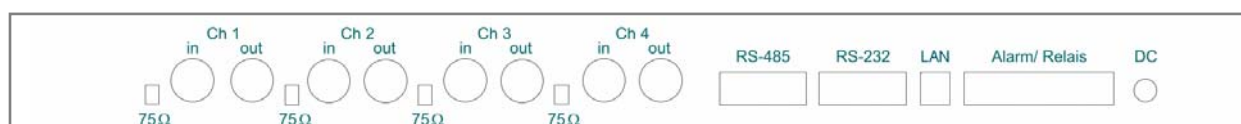
3.0 Pin assignment

Front side:

LED's:

Power:	Power supply
Control:	Operation mode
1:	Alarm channel 1
2:	- " - 2
3:	- " - 3
4:	- " - 4

Rear side:

Assignment:**RS485/ RS422 9-pol D-SUB female connector**

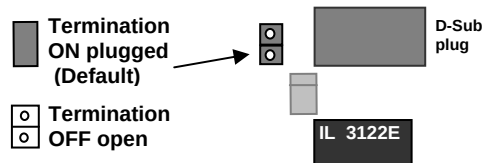
1	-	RS422 RxD/A (+) ; RS485 A
2	-	RS422 RxD/B (-) ; RS485 B
3	-	RS422 TxD/A (+)
4	-	RS422 TxD/B (-)
5	-	GND
6	-	Reserved
7	-	Reserved
8	-	Reserved
9	-	Reserved

Using port as RS485:

External Bridge between Pin1 + Pin3,
and Pin2 + Pin4

Termination resistor (Input; Pin 1+2):

Open the unit and change the jumper:

**RS232 9-pol D-SUB male connector**

1	-	nc
2	-	RXD
3	-	TXD
4	-	nc
5	-	GND
6	-	nc
7	-	RTS
8	-	CTS
9	-	nc

Null-Modem - cable assignment

PC		↔	EDM-40 :	
TxD	Pin 3	-----	Pin 2	RxD
RxD	Pin 2	-----	Pin 3	TxD
GND	Pin 5	-----	Pin 5	GND
RTS	Pin 7	-----	Pin 8	CTS
CTS	Pin 8	-----	Pin 7	RTS

Ethernet RJ45-plug 10BaseT/100BaseTX

1	-	Rx +
2	-	Rx -
3	-	Tx +
4	-	nc
5	-	nc
6	-	Tx -
7	-	nc
8	-	nc

Alarm / Relais 25 pin D-SUB female connector

1	-	External alarm input 1	Channel 1
2	-	External alarm input 2	Channel 2
3	-	External alarm input 3	Channel 3
4	-	External alarm input 4	Channel 4
5	-	External alarm input 5	- DST switch
6	-	External alarm input 6	- Global contact
7	-	GND	
8	-	GND	
9	-	GND	
10	-	GND	
11	-	GND	
12	-	GND	
13	-	GND	
14	-	RELAY 1	contact
15	-	RELAY 1	make contact
16	-	RELAY 2	contact
17	-	RELAY 2	make contact
18	-	RELAY 3	contact
19	-	RELAY 3	make contact
20	-	RELAY 4	contact
21	-	RELAY 4	make contact
22	-	RELAY 5	contact
23	-	RELAY 5	make contact
24	-	RELAY 6	contact
25	-	RELAY 6	make contact

nc: not connected

DC socket 2,1mm

Center contact positive: +9...12V/ 1000mA

Note: Only galvanically isolated, stabilized power supplies with +9 ...+12 V may be connected to the unit!

4.0 Brief Description

EDM-40 is a digital video sensor for simultaneous monitoring of four camera signals (channels) for indoor and outdoor applications.

The EDM-40 is also capable of detecting video picture changes under difficult light conditions.

The PC setup program interface of the EDM-40 allows comfortable setting of all sensor parameters.

First, the respective camera picture has to be transmit from EDM-40 to the PC and displayed in an editor window. Each channel can be configured for four time zones. Using the PCs mouse you can now define four sensor areas per channel according to the local conditions.

For each sensor area there are extensive setting possibilities such as number of sensor cells, sensitivity, perspective, reset timer or alarm strings.

For recognition of sabotage events like spraying or other manipulations you can adjust a special sabotage analysis.

In case of a detected object the EDM-40 can control a dome camera regarding to the centre of gravity ('Dome tracking'). You can choose a protocol from a list of many well known manufacturers.

Having programmed all setup-parameters, these are transferred from the PC to the EDM-40. The EDM-40 now operates with the new parameters independently from the PC.

The setup data can also be stored on hard disk/diskette. Thus it is possible to transfer standardized settings without great effort to several sensors. In case of failure, the service engineer can determine whether the setup has been changed by unauthorized persons and he can directly reestablish the original configuration.

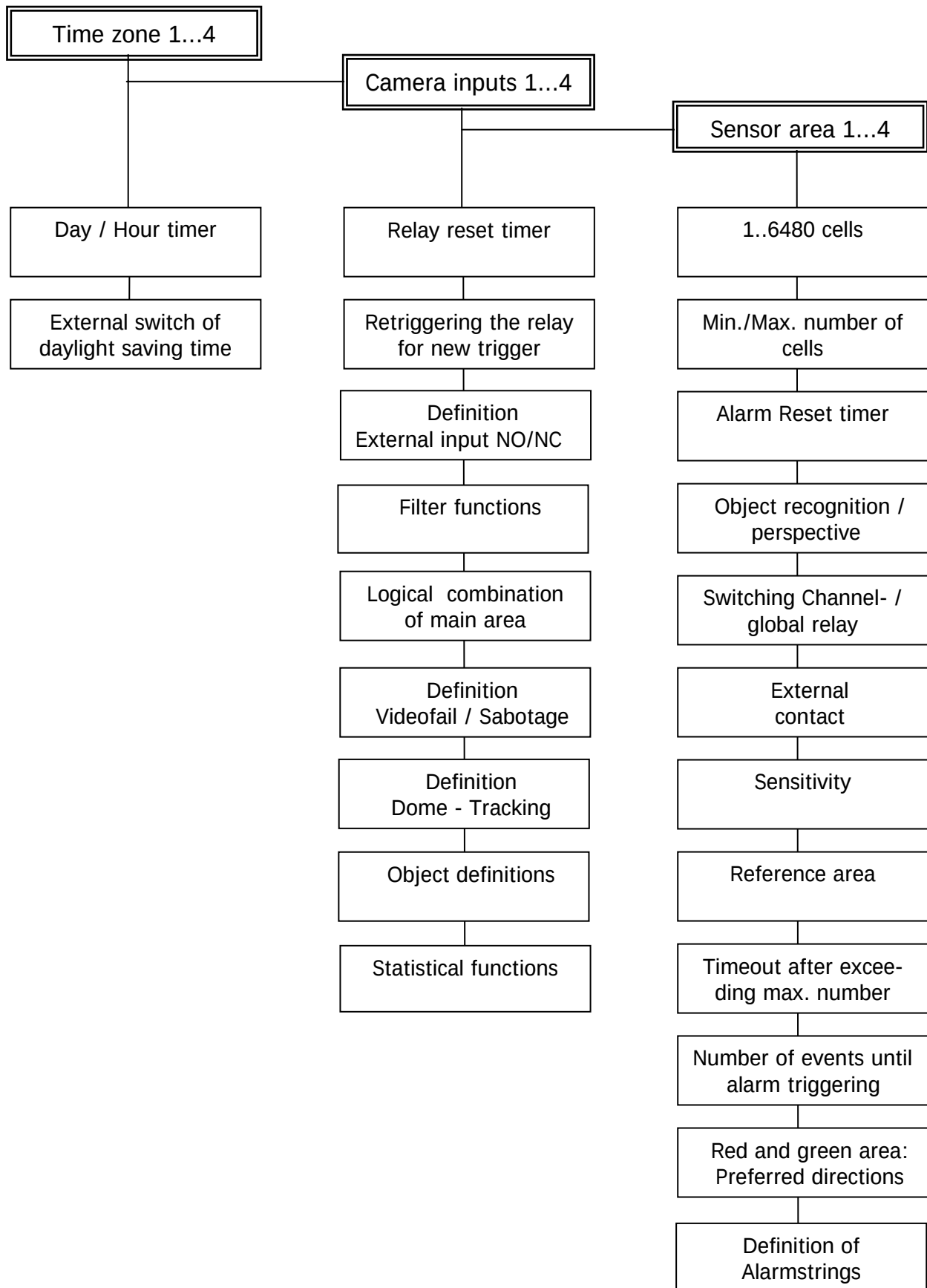
The camera pictures including the defined sensor areas can be stored in graphic format (*.jpg or *.bmp) for documentation purposes.

EDM-40 uses state-of-the-art Flash technology:

Upgrading the operating software (firmware) can be performed without opening the equipment, upgrades can be loaded via PC or laptop via the RS232 interface.

In the following sections the setup functions, the individual sensor parameters and their settings are briefly described. The diagram on the following page shows an overview of the parameters that can be configured in the menu.

5.0 Setup structure



The chart on the previous page shows, that the different functions of the EDM-40 are linked to the spheres of timezone, channel and area. These three spheres have the following hierarchical structure:

Timezone ◀ Channel ◀ Area.

Each of the timezones has four channels, each with four sensor areas. Therefore all parameters assigned to a timezone are valid for all subordinate channels and the corresponding sensor areas, too.

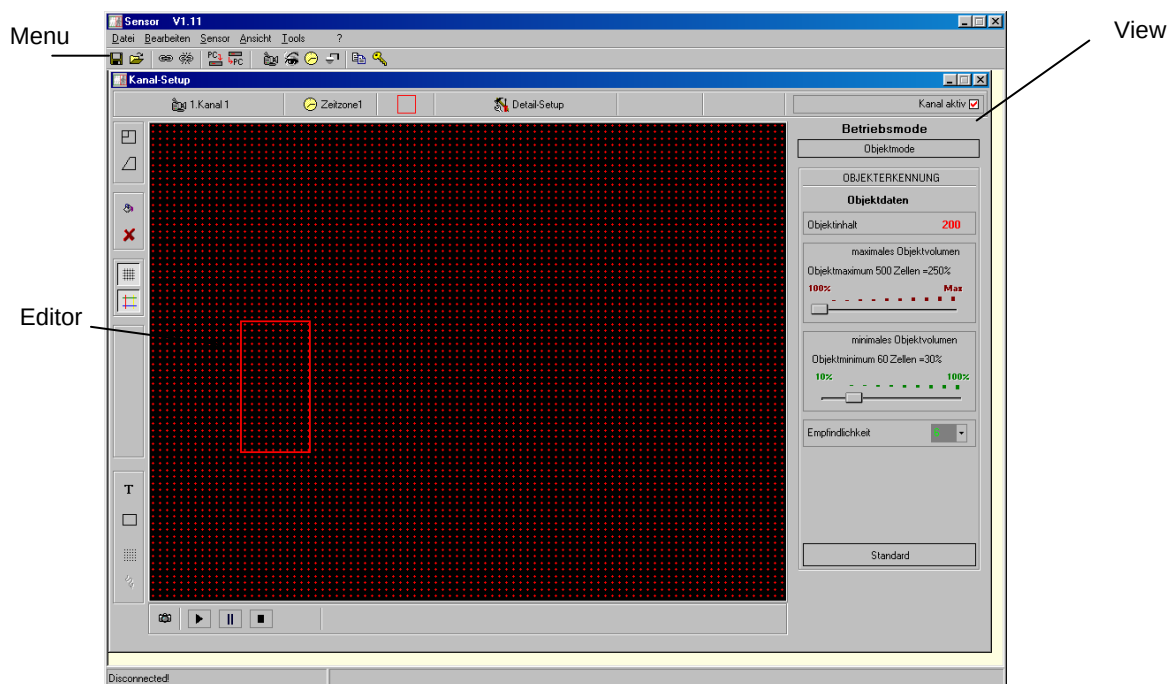
In the next chapter the structure of the PC dialog and the function of all parameters are described.

6.0 PC Dialog

After starting the program, the main window appears on the monitor.

Via the upper menu bar all sub menus for communication and global settings are reachable.

Under them an editor appears with the most important channel settings. The parameters can be directly adjusted in this window.

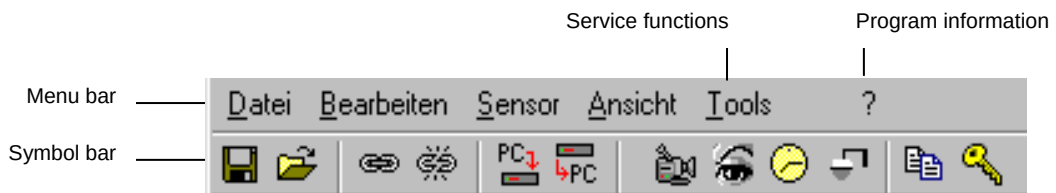


Standard settings (default values) are defined for all four camera channels.

All “switches” and input fields feature help texts, so that the user can quickly become acquainted with the setup procedures.

The following pages describe the individual setup functions:

6.1 Menu



The menu is divided in two areas: The *menu bar* includes functions via pull-down menus, who are reachable via buttons of the symbol bar too, and further configuration tools (service functions) and viewing options.

6.1.1 Symbol bar:

Provides direct access to all important functions:



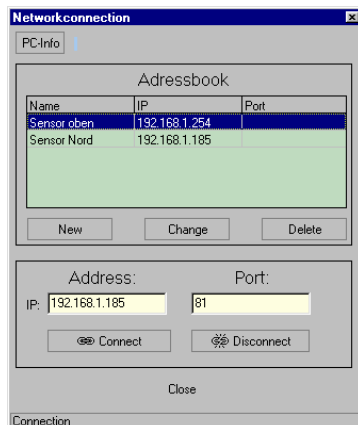
Save / Open File:

Saves / Loads a setup configuration previously stored on hard disk or diskette. This allows, for example, programming the sensors with standardized settings.



Connection via TCP / IP:

Opens a submenu for data transmission via TCP / IP or close a connection:



In the address list you can manage IP-addresses of many sensor units.

For open a connection select the desired name and click to the ,Connect'- Button.

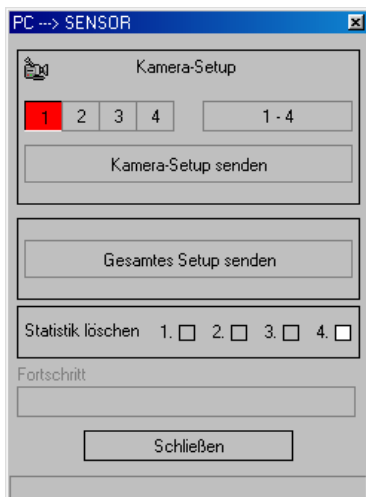
If the connection has been successfully established, a message appears and the dialog box is automatically closed.

The termination of a established connection can be done via the ,Disconnect'- Button.



Data transmission PC to EDM-40:

Opens a dialog box for controlling the transfer of setup data from PC to the unit:



- **Send Camera-Setup:** Programs the EDM-40 with the parameters that have been configured in the PC setup. This irrevocably overwrites the setup data in the EDM-40. Use the camera selection buttons (appears in red) to select the channel that has to be transferred.

If the connection has been successfully established, a progress indicator bar shows the progress of the data transfer. When the transfer has been completed, the dialog box is automatically closed.

- **Send entire Setup:** Programs the EDM-40 with the parameters of all 4 cameras inclusive the global settings.

The data transmission is performed as described in "Send Camera-Setup".

In case of errors during data transmission the status line displays error messages:
If, for example, the connection cannot be established, the connection settings must be checked.

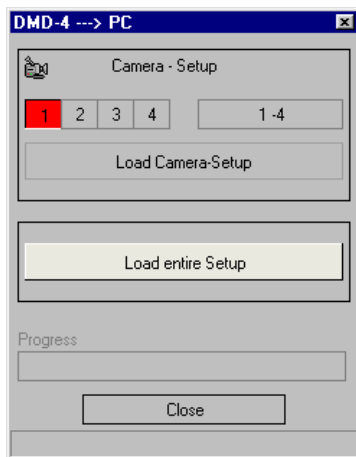
If an error occurs during data transmission, the process must be repeated.

• **..Delete Statistic:** The EDM-40 analyses each channel regarding his regular movements over the whole picture area. Over a longer time period the individual, statistical results will be collected and stored in an internal memory. After a fundamental change of settings, or after turning of the camera this clear function of the statistic values is recommend.



Data transmission EDM-40 → PC:

Opens a window for controlling the data transfer from EDM-40 to the PC.



- **Load Camera-Setup:**

Loads the sensor configuration of the desired camera (red button). This irrevocably overwrites the setup data of the PC. The data transmission is performed as described in "*Send Camera-Setup*".

- **Load entire setup:** Load the setup configuration of all four channels and the global settings of the EDM-40. The data transmission is performed as described in "*Send Camera-Setup*".



Open Channel Setup:

Opens in the viewing window below for setting all basic parameters of the channels (see page18).



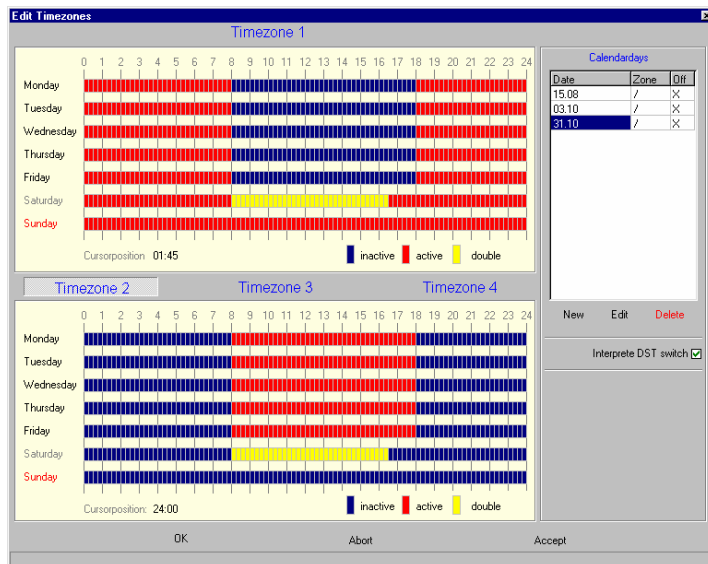
Open Channel-preview:

Opens a quad-view for all 4 channels, who are refreshed sequential with the live pictures. By mouse-clicking to one of the windows you can call up directly the regarding Channel-Setup.



Time zone definition:

Each channel of the EDM-40 is equipped with a total of four time zones. Different sensor areas can be placed for each of these zones. Therefore four completely independent day and week programs are editable for each channel.



First of all the zone to be defined is selected with the camera- and time zone buttons:

The time zone 1 is always displayed in the upper half, one of time zone 2-4 in the lower half of the window. With a mouse click or Drag & Draw (drag the mouse by pressed left button) you can define the active time for time zone 1 (shown as red blocks). In the left image there is an example for different shopping times. All the periods of the closed store are registered in time zone 1 as shown on the left side.

The blue blocks indicate an inactive time area. Time areas, that are overlapped by two or more time zones are colored yellow.

The priority within the four time zones is defined as going down from zone 1 to zone 4. Example: If zone 1 and zone 3 overlap, only zone 1 is active. If you only need to work with one time zone than there is no need to program all zones:

Marking the hole area (*Monday...Sunday , 00:00...24:00 o'clock*) for time zone 1 activates the system for the whole week, 24 hours a day.

Note: The sensor is disabled if not one of the 4 time zones is active.

For some calendar days you can define the special zone-function on these days. The definition of calendar days is independent of any years!

The sensor is equipped with an integrated switching input of daylight saving time (DST). If the switch is activated (*interpret DST switch*) the sensor automatically switches – in case the contact is closed – between the time zones as follows:

When the contact is closed, the unit regards - in according to the time definition – only the settings of time zone 2 or 4. On the other hand (contact is open) only the parameters of zone 1 or 3 are possible.

Example: A day- and night program has to be defined for Monday to Friday respectively Saturday and Sunday each. For that purpose the hole time area from Monday to Friday is activated in zone 1 + 2, the same area of Saturday and Sunday in zone 3 +4. This results that Mo.-Fr. the unit is defined by time zone 1 during the day, in the night by the settings of zone 2. On the weekend (Saturday, Sunday) the sensor switches between time zone 3 (during the day) and time zone 4 (night)..

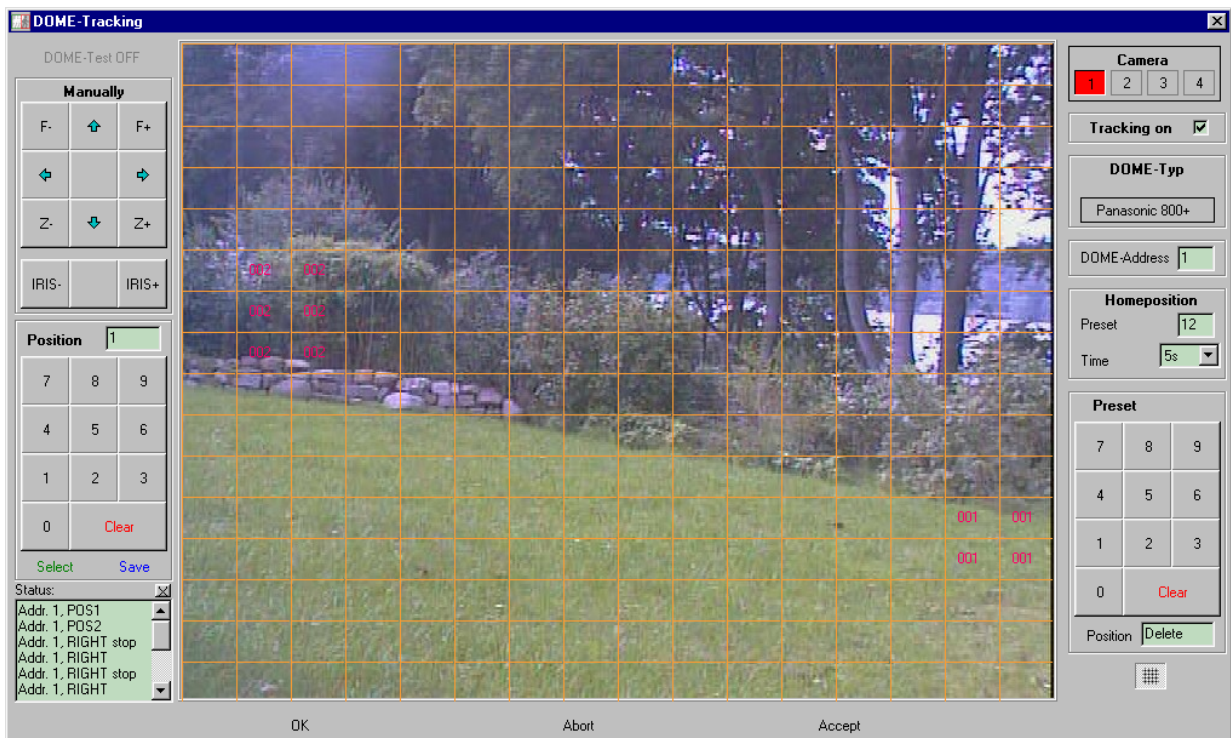
By using the DST switch the priority is also valid: If the active areas of time zone 2 and 4 are overlapping to each other, in the overlapping area only the settings of time zone 2 are valid.



Dome-Tracking:

Using the mode *Dome tracking* the EDM-40 controls the presets of a P&T head regarding to the coordinates of an object, that has been detected. According to different camera-types and –protocols the EDM-40 has to be programmed with a special ‚Dome-Firmware‘ (see *Sensor options*). An information about the activated protocol appears by using the ‚Dome-Type‘-button (The default protocol is ‚Panasonic‘).

The individual setting of presets, dome address and home position can be adjusted for each channel in the following dialog box:



First of all the Dome tracking mode has to be activated (‚Tracking On‘) and the dome address has to be entered. Optionally you can define a home position: After expiration of ‚time‘ since the last preset command the EDM-40 will call up this preset number automatically. Note: Activating the Dome tracking mode automatically activate the RS485 interface (see page 27).

All preset numbers can be defined for each cell within a 16x16 grid :

Using the numeric pad buttons of ‚preset‘ the actual preset number in the position field is entered. Then the mouse cursor is positioned on a grid cell and by clicking the left mouse button the cell is defined by this number. Deleting cells is performed as follows: Define the actual position as ‚Delete‘ (‚Delete‘ button) and click on the desired cell. When the mouse cursor is positioned on a cell, that has been already defined, the preset number of ‚position‘- field will be overwritten by the cell-preset by clicking the right button.

To control defined presets in according to the picture areas of the reference camera you can activate ‚Dome Test ON‘ using the connected sensor/dome:

Clicking on a defined cell or using the numeric pad on the left and the ‚Select‘ button the sensor will send the command for the desired preset number. If required you can manually adjust the settings of the preset (P/T, zoom, focus, iris).

Please use the button ‚Save‘ to store the new preset settings in the dome.

The window of ‚Status‘ shows the last commands.

IMPORTANT: The following conditions have to be performed for dome tracking:

► The centre of gravity of the object is within an area with 'object mode/perspective'; ► The channel is activated; ► The object size is between minimum and maximum number of cells.



Copy Setup Data:

This option allows the copying of sensor settings within the channels or timezones:

In the left example all data of timezone 1 will be copied to timezone 3+4 over all 4 channels, regardless of the 'Camera'- configuration.

However, by copying Camera settings or Alarm strings the source/target-configuration of timezone is important:

According to the upper timezone definition all camera data /alarm strings of camera 2, timezone 1 will be copied to timezone 3 of camera 3 and 4.

Therefore the user does not have to program the whole setup anew if the parameters of the sensor areas only differ marginally.



Change Password:

The setup data is protected from unauthorized access by a password. A data transmission can only be executed successfully if the password of EDM-40 and PC program are the same. It is recommended to alter the password immediately after the first start of the setup program.

NOTE:

The password can only be changed when the sensor is connected to the PC interface and has a maximum length of 10 characters and is case-sensitive!

The password can be changed in the following dialog box:

- **Old Password:** Enter the current password of the DMD. The pre-configured password is "**video**".
- **New Password:** Enter the new password.
- **Confirm Password:** Repeat and confirm the new password.

The new password is accepted by clicking "*Change password*".

Attention:

When the password has been lost, please contact your dealer.

Service tools:

Opens a pull-down menu for controlling the following submenus:

Sensor options
 Load Defaults
 COM
 Use COM
 Change Password
 Choose Language

- Sensor options:**

Sensoroptions

Program Firmware

MAIN
DOME

Read Firmwareversion

Version	Serial	Date	Dome Typ
MAIN	V0.90	31.08.2006	
DOME	V1.00	12.06.2006	VCL

Date / Time

PC-Zeit: 04.09.06 09:27:23

DMD-4: 04.09.2006 09:27:10

Summertime active

Change IP-Settings

IP: 192.168.001.160

Port: 81

Netmask: 255.255.255.000

Gateway: 192.168.001.001

WARNING! Changing of the IP-settings terminate the connection!

Close

Receive Date / Time

Program Firmware:

The EDM-40 is Flash-programmable. This means that the firmware can be transferred to the processors by a PC. Changing EPROMs and thus opening the device is not required.

When the firmware is changed, for example during a functional upgrade or with special software, the firmware is loaded to the EDM-40 via this dialog box.

The sensor is equipped with 2 flash memories: *Main* and *Dome*.

By clicking the corresponding button, the Windows "Open File" dialog box is opened and you can select the file (*.bin) to be programmed. Subsequently, the transfer to the sensor is done and a percent display indicates the progress of the process.

After successful transfer, the message "Firmware programmed" is displayed on the right hand of the button.

In case of errors during data transmission the status line at the bottom displays corresponding error messages.

Read Firmwareversion:

The actual firmware versions and the date of each last programming action are displayed. By pressing the 'version' button the current data of the EDM-40 are displayed. An overview of the current releases is shown on Appendix (page 33).

Date / Time:

By clicking the button 'Send Data /Time' date and time are transferred separately in order to synchronize the internal clock of the EDM-40 with the system clock of the PC. You can double check the actual time setting by clicking on 'Check Date/Time'.

Change IP- settings:

Allows to read out and change the actual IP-configuration of the sensor.

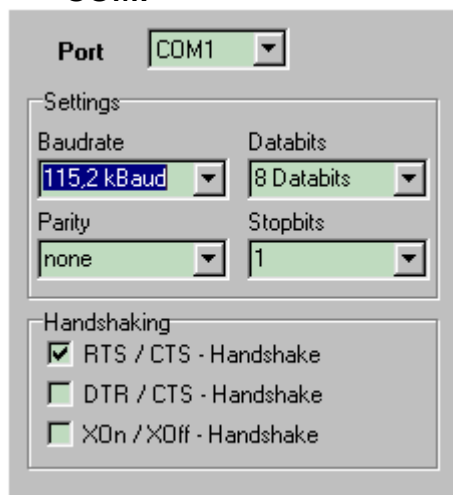
Notes: Changing of the IP-address will always result a disconnect of the established network connection. If necessary the PC / laptop have to be switched to the new IP-address. It is recommend to document the actual IP-configuration.

- **Load Default:**

Restores the default values (restart) of the PC user interface.

ATTENTION: A reset overwrites all current setup settings of the user interface with default values!

- **COM:**



Allows setting up the configuration-RS232 interface of the PC (COM1...COM50), to which the sensor is connected:

The EDM-40 interface is factory-configured as follows:

- .. 8 data bits
- .. no parity
- .. RTS/CTS
- .. Baud rate 115.2 KB.

- **Use COM:**

Defines the kind of configuration interface Ethernet (default) or RS232-comport (settings see above). By clicking to point 'Use COM' you switch between of using Comport (a '●' appears in front of 'Use COM') and the Ethernet (the '●' disappears).

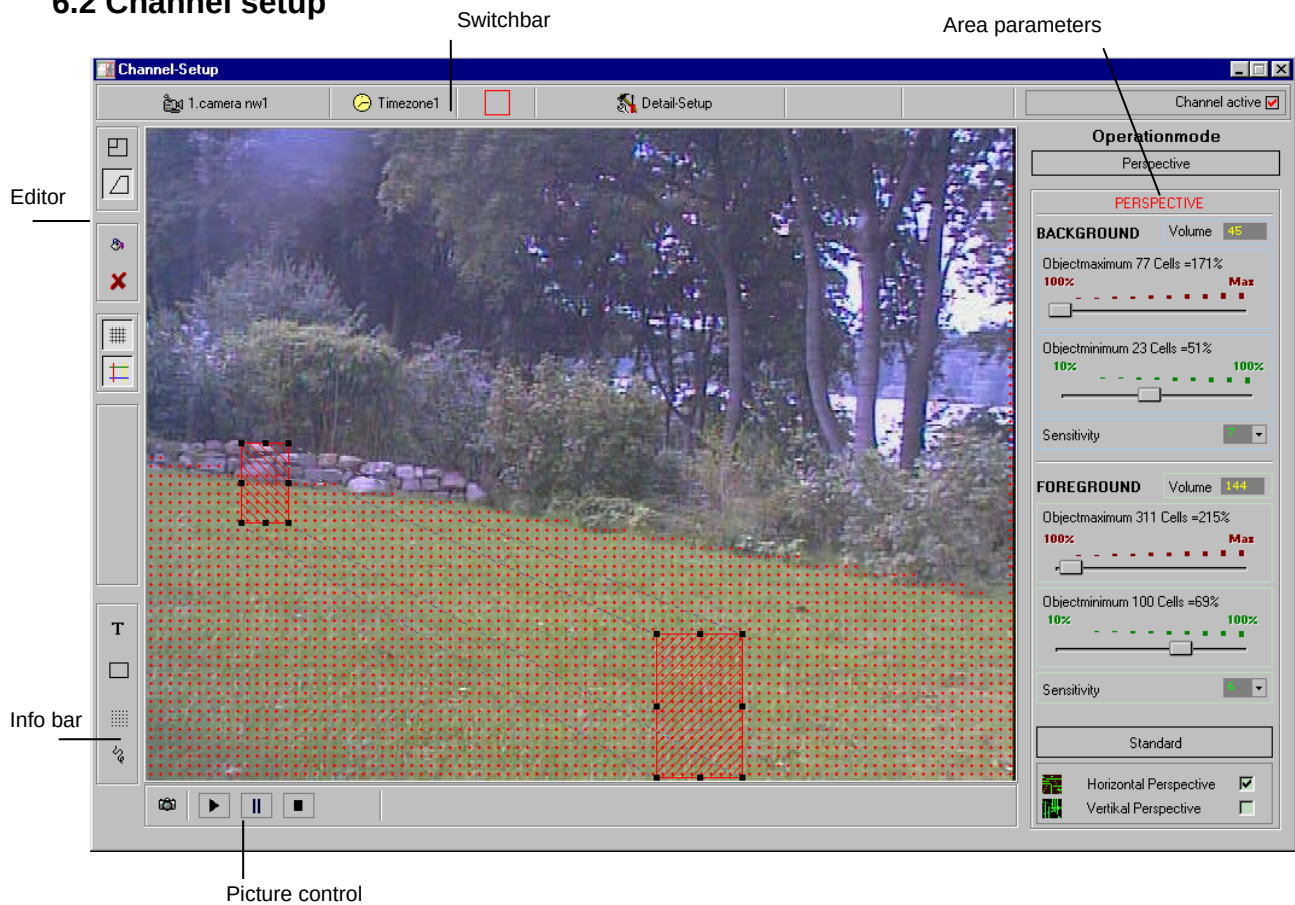
- **Change password:**

Opens a submenu for changing the actual password setting. You will find further descriptions on page 15.

- **Change language:**

Opens a window for changing the actual language setting of the PC-program. The setting will be valid after a restart of the PC too.

6.2 Channel setup



6.2.1 Switchbar:

**Channel switch:**

Switches between setup setting of camera 1...4.

**Time zone:**

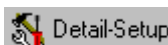
The time zone to be configured is selected with this button.



Area switch: To be able to distinguish the sensor areas from each other via pull-down menu:

-  = Main alarm area
-  = Pre-alarm area 1
-  = Pre-alarm area 2
-  = Pre-alarm area 3

In the example shown above, the setup parameters refer to sensor area 1 of camera channel 1.

**Detail-Setup:**

By activating an overview of all channel parameters will be displayed (see description on page 24).

6.2.2 Editor:

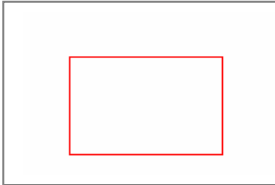
The editor area with the camera picture of the corresponding channel is divided into 6480 parts, called cells. The sensor area is defined by all highlighted blocks of the corresponding colour. It is not necessary that all blocks are adjacent to each other. An overlapping of two or more areas is not allowed.

The editor tool bar provides several functions for the editor display and for positioning the individual cells:



Define / Delete area:

If a larger area of the sensor area is to be activated or deactivated, this area can be marked with the mouse:



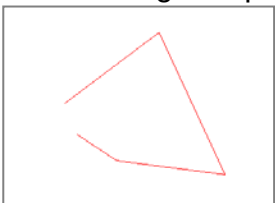
Position the cursor in the editor, press the left mouse button and draw a frame around the desired cells by dragging the mouse. Depending on the sensor area selected, the rectangle is shown coloured. The corresponding function is executed on the marked area, after releasing the left mouse button.

Deleting cells is performed according to the same principle: The mouse cursor is positioned on an cell and by clicking the right mouse button the rectangle appears black and after releasing the right button all cells in the defined area are deactivated.



Define / Delete polygon:

The drawing of a polygon allows a quick area definition :



By pressing the left mouse button you define the edges of the polygon. If you have keep pressed the left mouse button for 2 seconds: All cells inside of the polygon turn in the area colour and are activated.

Deleting cells is performed according via the right button: the edges of the deleting polygon are defined by pressing the right mouse button. After definition of all edges you have to press the right button for approx. 2 seconds, and all cell inside of the polygon will be cleared.



Set all cells:

Activates all cells from the current sensor area. If some cells also defined by another area, only the remained cells will be activated.



Delete current area:

Deletes all cells from the current sensor area.



Show / Hide area display:

Switches between the camera image with or without displayed area in order to check the right overlaying of picture and cells.



Show all areas: For easier positioning it is possible to display all areas in the editor. The area that has been selected by the area switch is edited.

6.2.3 Picture control:

For an exact overlay of the defined area the picture of the corresponding channel has to be displayed. You can receive a single picture from the connected EDM-40.

Furthermore you can get a continues live stream of up to 6-7 pictures / second, in order to control the analysis of the sensor. Different display functions of the internal sensor information are available and are described on chapter 6.2.4 .



Load current single picture:

The old picture display will be overwritten by a new picture.



Start picture stream:

The displaying of current live pictures will be started.

Notes: For changing of parameter settings it is recommend to stop the picture stream first.



Pause picture stream

The displaying of picture stream will be paused.



Stop picture stream

The continues picture stream will be stopped, in the editor field remains the last received picture.

6.2.4 Info bar:

By viewing the picture stream there are some tools to inform the installer about the internal effect of the DMD:



Show / Hide picture info:

Displays informations about size, date in the left, upper side of the picture.



Show recognized objects

The sensor will mark objects, who correspond to the defined object size, as a green frame, additioned with a motion vector. In case of an alarm the state will be displayed above of the frame.



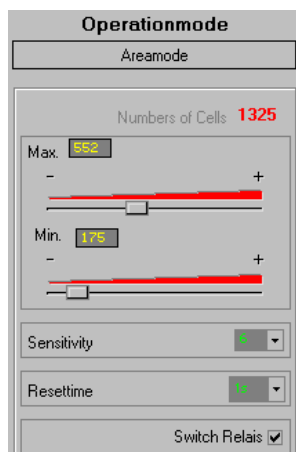
Show all activated cells:

Alterations in the camera picture are visible foe each individual cells. The sensor will mark the cells as orange points.

6.2.5 Area parameters:

Up to 3 different operation modes can be defined for each area. The display of parameters switch in according to the desired function. The meaning of each mode and the corresponding functions are described on the following pages:

- **Areamode**



Every sensor area has parameters that can be edited independently from the other areas in this dialog box. A selection of fundamental parameters are shown on the right hand of the edit field :

Number of cells : The display of activated cells (here 1325) is only an information and will not be stored in the sensor.

Max.: A change of the picture is only evaluated as an alarm, if not more than the set cells detect a movement (here: 552). The desired number of cells is set by means of the slide control (the value appears absolute and as percentage).

Note: The sensor area is deactivated at the "Max" setting (=0).

Tip: You can change the slider-value in single steps by using the arrow keys of your keyboard.

If more than the set cells detect a movement, the timer "Max break" (see page 25) is activated. This function prevents triggering for brief changes of the light conditions etc.

Min.: The alarm is only triggered if at least the number of set cells detect a change in the sensor area. Thus, too small and therefore irrelevant objects do not cause an alarm.

Note: Min=0 is the same as Min=1, which means that at least in one cell a movement has to be detected before the area is triggered.

Sensitivity: Sets the sensitivity for all marked cells of the sensor area. The higher the value set (1-10), the higher is the sensitivity of the cells.

"Sensitivity" defines the trigger's sensitivity of the time interval.

Reset time: Is started when the sensor area initiates an alarm.

After expiration the alarm of the sensor area is reset. This includes: The display of the area, the internal linking (see "Logic" on page 29) and the transmission of the serial alarm strings ('Alarm OFF strings', see page 27) .

NOTE: The alarm relay – if activated – is only reset after expiration of the relay energizing time set under "Camera options" .

- **Object detection**

In the object mode all detected, contiguous cells are combined as one or more objects according to their position to each other. The objectsize and not the total number of activated cells will be compared to the defined number of maximum/minimum cells . Up to 32 independent objects can be detected within the defined area simultaneously. The following illustration shows the object detection mode :

Object volume: Number of the cells that are enclosed by the rectangle in the edit field (in the example on the left side 200). The number is only a information to estimate the object size. This parameter has no further influence and will not be stored in the sensor unit.

The definition of the object size can only be set by *Object maximum/Object minimum*, described next.

Object maximum / Object minimum: An object within the defined area is only evaluated as an alarm, if the number of detected cells is between the object minimum and object maximum (in the example between 78 and 494 cells).

Exceeding the object maximum will start the timer ,Max. Break', if selected.

Sensitivity: The entry of the parameter are performed as described in *Area Mode*.

Standard: According to the object volume of the rectangle the values of max. – and min. object volume will be set to 250 per cent and 29 per cent respectively. This value is a basic pa-

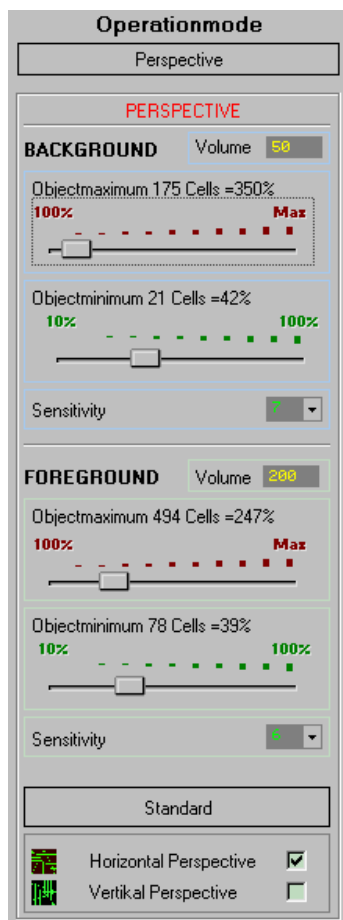
parameter based on operating experiences. However the installer have to find out the optimal values according to the real scenery.

- **Perspective**

The sensor is detecting in addition to the object mode according to perspective parameters. Two rectangles appear on the edit area for defining the position of the foreground and the background.

Important: The number for the object size in the foreground / background (example of image: foreground 200, background 50) are only an information to estimate the desired object size. The definition of the object size is effected by the parameters *Maximum/Minimum* on the right hand of the edit:

Background: An object on the background position (Definition: center of the rectangle) triggers only an alarm if the number of activated cells is in the range of object minimum and object maximum (In the example between 21 and 175). The same range is valid for objects that are farther away. For more informations see *object foreground*. The sensitivity is valid for all cells that are on the background position or farther.



Foreground: An object at the fore position (Definition: The center of the fore rectangle) triggers only an alarm if the number of activated cells is in the range of object minimum and object maximum (In the example between 78 to 494). The same range is valid for objects that are positioned nearer. The sensitivity is valid for all cells that are on the foreground position or nearer.

Important note: For all object positions between fore- and background the EDM-40 calculates automatically the intermediate values of maximum, minimum and sensitivity.

Standard: According to the object volume of the rectangle the values of max. – and min. object volume will be set to 250 per cent and 29 per cent respectively.

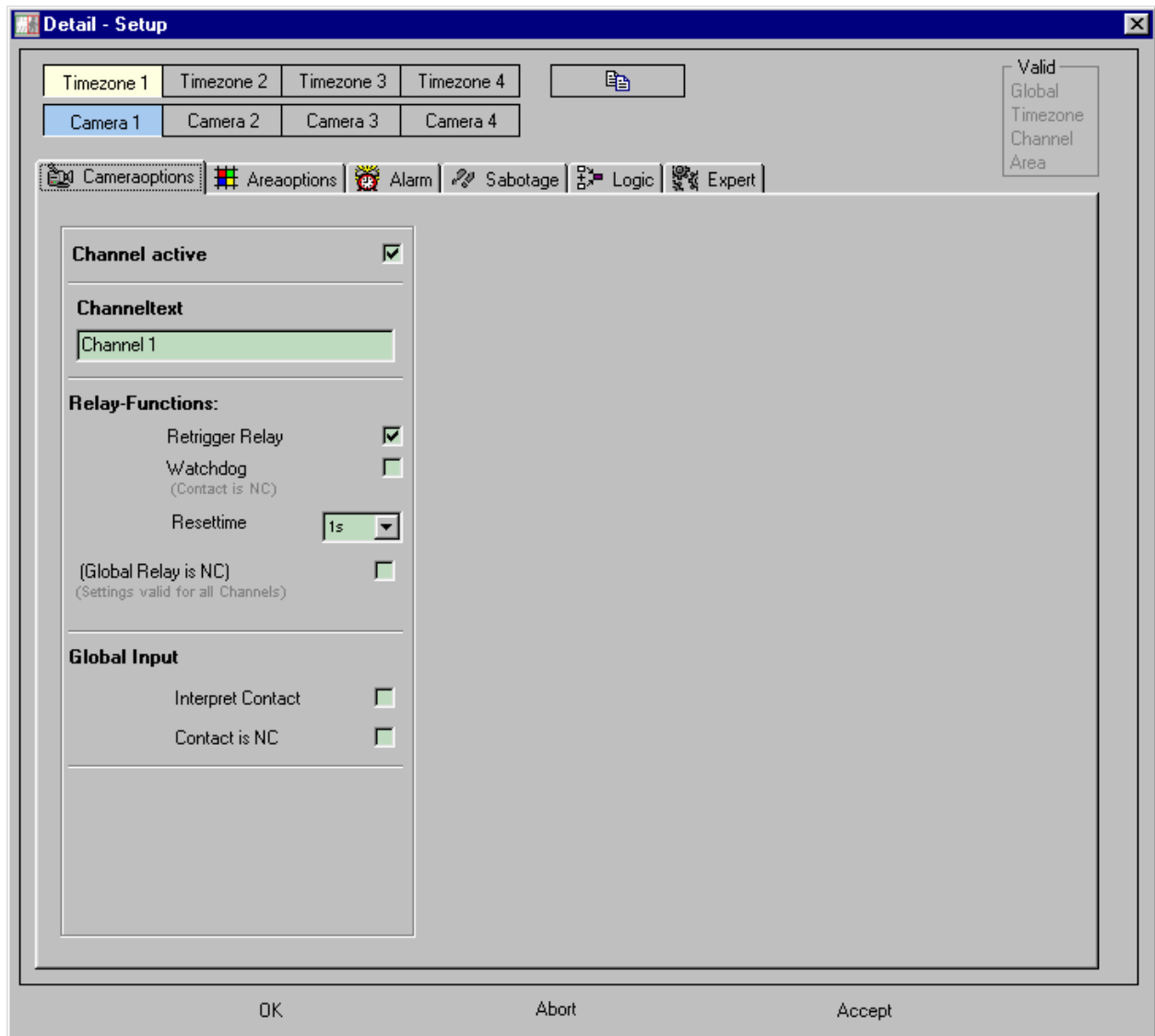
Perspective: There are two kinds of perspective-definitions:
Horizontal: An object, that is moving at the same image column, appears smaller in the upper rows (background) than in the lower rows (foreground). This is typical for camera configurations outdoors.

Vertical: An object, moving at the same image row, appears smaller (bigger) on the left side than on the right side, for instance a camera perspective along a wall.

6.3 Detail Setup:

For each of the four channels special parameters can be set. The menu is divided in different areas. The validity of the current parameter is green displayed in the upper right edge ,valid'.

Via the switch buttons of time zone and cameras all important set parameters can be directly adjusted. Via the copy button you can copy the parameters between channels and time zones (see description on page15).



The following pages describe the function of the submenus:



6.3.1 Camera options:

- **Channel active:** Allows quick activation/deactivation of the channel, for example when maintenance works in the viewing range of the camera are not supposed to trigger the EDM-40 or to be detected as sabotage.
- **Channel text:** The text can be edited directly in order to identify the meaning of the camera. This identifier appears in the Channel setup.

- **Relay functions:**

Defines the settings of the channel- and global relay. The definitions *Retrigger* and *Reset time* are valid for both relays.

Retrigger relay: If another alarm occurs during the time the relay is energized, the time is automatically prolonged by the configured time.

Watchdog: (De-)activate the watchdog function (relay is normal closed) of the channel relay.

Reset time: Defines the time the relay is in energized state. The maximum time is 120 seconds = 2 minutes

NOTE: The selected time is equal to the auto reset time for the LED display.

Global relay is NC: If activated, the watchdog function of the global relay is on.

- **Global Input:** The sensor is equipped with an external global input, which can be considered by each channel separately :

Interpret contact: If activated the contact state has to be according to the global contact definition (see next parameter).

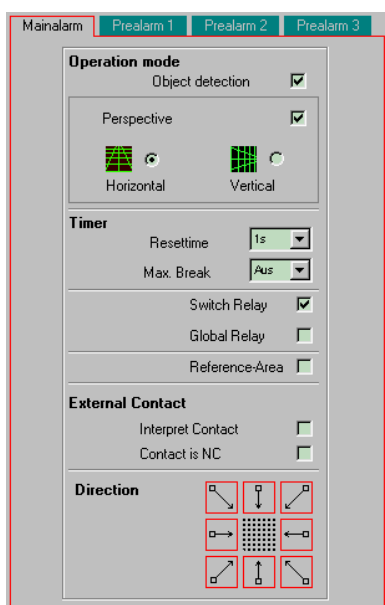
Contact is Normally Closed: Subordinate channel can be linked to this input.

When the channel parameter '*Interpret contact*' is activated, the channel only triggers if

- a.) the global input has been closed (checkbox '*Contact is NC*' is active)
- b.) the global input is open (checkbox '*Contact is NC*' is not active).



6.3.2 Area options:



All important parameters of the main area and the 3 pre-alarm areas are listed in this submenu. You can switch the setting between the areas by clicking on the upper buttons.

- **Operation mode:**

Defines the kind of operation mode (see description '*Area parameters*' on page 21).

- **Timer:**

Defines the following timer:

Reset time:

Timer is started when the sensor area initiates an alarm.

After expiration the alarm of the sensor area is reset. This includes: The internal linking (see "*Logic*" on page 29) and the transmitting of the serial alarm strings ('Alarm OFF strings', see page 27) .

NOTE: The channel relay will only be reset after expiration of the relay energizing time set under "*Camera options*".

Max. Break: Time within the sensor area stays inactive after exceeding the maximum permissible number of triggered cells (Min./Max.).

Prevents repeated triggering after switching on room lights etc.

- **Switch relay:** The relay of the corresponding camera channel is energized for an alarm of the sensor area.

Note: If the area is only to trigger a pre-alarm, this function usually must be deactivated.

- **Global Relay:** The global relay is energized for an alarm of the sensor area. The function of this relay is a logical OR-function of all areas, who switch according to this function the global relay.

- **Reference area:** If an area is defined as reference area, it is evaluated with priority: In any case, the reference area is analyzed before the other area of the channel. Where a reference area is defined to suppress influences that make an effect to the whole picture e.g. weather influence like clouds.

- **External contact:**

Each channel is equipped with an external input, which can be taken into account for alarm processing.

Interpret contact:

When the option is activated, the sensor area only triggers if the external input has been connected in the manner (normally open or normally closed) that has been defined as '*Contact is NC*'. The external input allows several applications:

Controlling the sensor area by an automatic timer, additional combination with an IR alarm, manual control (gate keeper) etc.

- **Contact is NC:**

When this area parameter is activated, the sensor area only triggers if

- b.)** the external input has been closed (checkbox '*Contact is NC*' is active)
- c.)** the external input is open (checkbox '*Contact is NC*' is not active).

- **Direction:** Configuring eight possible direction preferences, objects triggers only an alarm those movement is in the selected direction. Movement in the opposite direction will not trigger any alarms. If no direction is selected (all arrow buttons appears with red frame), no direction filter is active and all movements could cause an alarm..



6.3.3 Alarm:

Allows the configuration and entry of a character string (alarm string) that is transmitted via the RS232/RS422- or Ethernet interface of the EDM-40 to peripheral devices like a switch or recording system

Alarm strings can be defined for the main area and for the three pre-alarm areas of a camera channel. By clicking to the buttons *Main alarm* and *Pre-alarms* you can switch between the different editor menus.

The EDM-40 can transmit one data string after alarm activation and after Reset time has expired. Thus the peripheral devices connected can be controlled differently for alarm activation and expiration of the Alarm Reset time.

Example: For an alarm a matrix-output switch to a full picture of the corresponding camera. After the expiration of the Auto Reset time, the EDM-40 will send a command for quad view.

The maximum string length is 40 characters. The characters are input in hexadecimal notation, i. e. only characters from 0...9 and A...F are allowed.

This type of character-coding allows transmission of any text and control commands.

Important: The string is only transmitted when the box for ON respectively OFF is checked. In the Pre-alarm menu the checkboxes define these pre-alarms, who have to send out the defines strings.

The following example shows a character string that has been defined for sending an alarm text:

Code (HEX)	02	41	6C	61	72	6D	20	54	6F	72	20	31	03
Character	STX	'A'	'I'	'a'	'r'	'm'	' '	'T'	'o'	'r'	' '	'1'	ETX

In the submenu *Alarm interface* at least one of the three possible interfaces have to be activated. The menu to define the serial settings appears after clicking on *Setup* :

IMPORTANT:

If *Dome-Tracking* (view S.14) is active the settings of RS422/RS485 should be in accordance with the data format of the according dome protocol.

In standby mode the RS232 settings of the EDM-40 are adjusted to the data communication between PC and EDM-40 (see *Use COM* on page 17).

In the case of sending alarm strings to peripheral devices the EDM-40 automatically switches to the interface settings which have been defined in this menu. After transmitting the alarm string the EDM-40 automatically restores the original interface parameters.



6.3.4 Sabotage:

Up to 3 different kinds of sabotage detections can be defined for each of the four channels:

Video fail

When a video signal fails – channel is activated (see *Camera Tool Bar*), no video signal has been applied to the input – the LED of the corresponding channel flashes on the front side of the device.

Video signal level

When this function is activated an arithmetic reference value (for all picture intensities within the defined green area *prealarm3*) over 5 minutes will be calculated in order to take account of slow illuminance al-

teration, like twilight, common changing of weather conditions.

At the same time a arithmetic mean is registered over a short time of 10 seconds. Intensity changes by moving objects effects no alarm. Durable changes like covering of the camera objective or a lasting local variation in the camera picture causes a sabotage alarm. In this case after 5-10 seconds an alarm occurred.

The alarm threshold can be adjusted in 9 steps. In case of outdoor areas (short-term intensity changes by sun or clouds) it is recommended to set the threshold to higher signal deviation.

Signal characteristic

By activating of this function a reference value will be initiated, however as an average difference of the arithmetic mean. The calculation is done for the distribution of all intensities within the camera picture. This feature is especially recommended for high-contrast images, because sabotage by paint-spraying to the camera objective or distorting of the camera-view effects a bad-focused and low-contrast image in the most cases. The reference value is adapted dynamically. The notes for alarm activating and the alarm threshold is performed as described in '*Video signal level*'.

A sabotage alarm can be indicated by energizing the sabotage relay and / or by sending a serial sabotage string (definition for each channel; character entry and interface definition as described in '*Alarm*' on page 27).

The relay is energized as long as the sabotage is detected.

The transmission of the serial string starts with detecting a sabotage and – setting 'repeat' is activated – each second anew..



6.3.5 Logic:

Each main alarm area can be logically linked with the channel-own pre-alarm areas and the main alarm areas of the other channels. This results in a higher switch security and ensures that temporal sequences are detected.

Logical Connections Mainalarm area

Check:

Prealarm 1 + ... + ... + ...

OR

Prealarm 2 + Prealarm 3 + ... + ...

Legend:

Red bar : Area is triggered

Grey bar : Area is not triggered

First of all the main alarm area to be defined is selected with the time zone- and channel- buttons.

Afterwards the combination of the additional areas can be done:

All edit fields, who stands in parallel are together with the defined area AND connected and constitute a term.

Under it one more term can be constituted.

If the conditions of one or both terms are true, the defined area is triggered.

The bar above the entry fields defines the condition 'area is triggered' (bar is red), or 'area is not triggered' (bar appears in grey).

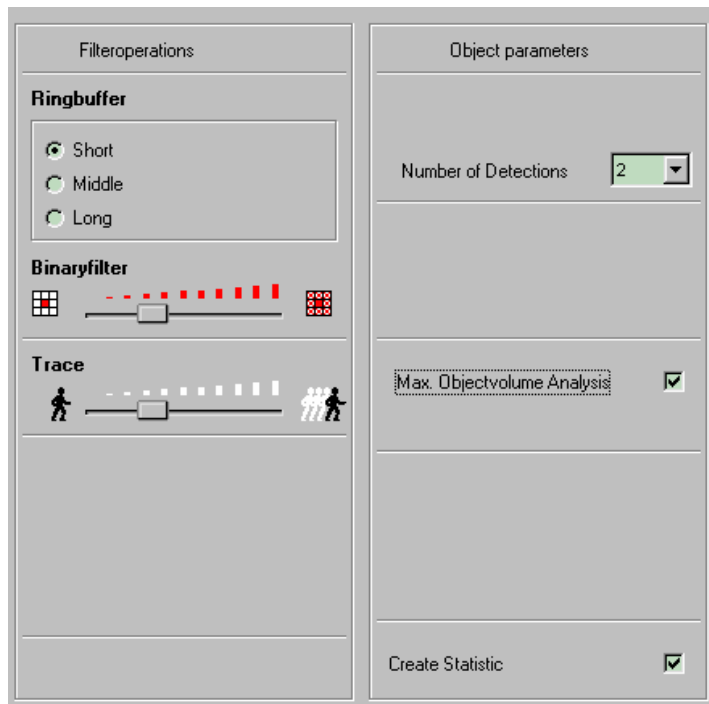
In the example above the *main area* is only triggered,

- if the green area *prealarm1* is triggered too , **or**
- if the yellow area *prealarm3* is triggered too and the blue area *prealarm2* is not triggered.



6.3.6 Expert:

The settings of the expert menu are pre-configured for the most typical applications. In order to adapt the EDM-40 in an optimal way to the real szenary the meaning of the following parameters are described:



- **Ringbuffer:**

The EDM-40 scans the entire video picture 8 times per second. Thus, very fast picture changes can be correctly detected.

If tiny objects move very slowly, sensors with a measurement of a fixed, short time interval may not always trigger correctly between two video pictures which are to be compared.

The change in brightness as compared to the time interval is not large enough to exceed the trigger sensitivity (see also "*sensitivity*", page 21)..

The EDM-40 solves this problem by an extension of the time intervall by means of an internal circular buffer. Now slow movements in the picture

can be correctly detected.

The setting of *middle* / *long* in connection with changing illuminations can cause unmeant activations particularly in outdoor applications. Therefore this parameter has to be set very carefully.

- **Binary filter:** Defines the suppression of noise- and fail-influences against to the detecting objects. The function can be set in four steps.

The size of proximate, detected cells grows by increasing this parameter.

In case of great detecting objects at fore- and background(!) the increment of the binary filter value is highly recommend!

- **Trace:** The EDM-40 is analysing all current, detected objects regarding to their further course. The length of the resulted motion vector is a measure for the distance covered. (Trace). The value of the trace parameter defines, whether a recognized object causes immediately an alarm (left position, *trace* is disabled), or after achievement of a minimum trace distance (short, middle, long).

Objects, who are moving predominantly in one direction, can be unambiguously identified. On the other hand, objects that do not move in one direction such as a tree in the wind cause only a local movement without a significant trace.

Note:

Increasing of the value *trace* extends the analysing time of the objects and the time until alarm triggering!

- **Number of detections:** Changes of the sensor area that – according to the configured parameters – must cause an alarm has to be detected n times immediately following each other (n = parameter value) before the alarm becomes active. Thus, nonrecurring events such as light reflections can be excluded.

Note:

If an object enters the alarm area an additional delay ($n \times 1/8$ second) occurs before the alarm is triggered..

- **Max. Object Analysis:** If activated, the parameter 'maximum object size' (area parameters) would be utilized. In many cases exceeding of the defined maximum cells is a global changing over the whole picture area, which shouldn't cause any alarm for a short time (see 'Max. Break' on page 25).

The disabling of this parameter means that all objects over the minimum number will activate the area irrespective of the defined maximum.

- **Create statistic:** The sensor can make a dynamic statistical census of each single cell, in order to consider periodical noises, interferences, and to eliminate these influences against singular events the objects.

The mode is qualified for outdoor applications, in which only few changings and objects could be detected.

The census starts after a reset new.

Disturbance: Controller to set the size of the disturbance in relation to the min. size of the object. Default is 50%. Is the size of the disturbances in the alarm area huge (Bushes, trees), then its advisable to increase the value. When snow or heavy rain appears in the picture, its not necessary to change the value.

Statistic reduction: Define the time, where the statistic decreases to zero after no disturbance is recognized. This parameter should only be changed (decreased), when public areas with a lot of traffic are monitored.

7.0 Appendix

7.1 ASCII-Table:

character	HEX	character	HEX	character	HEX
<NUL>	00	+	2B	V	56
<SOH>	01	,	2C	W	57
<STX>	02	-	2D	X	58
<ETX>	03	.	2E	Y	59
<EOT>	04	/	2F	Z	5A
<ENQ>	05	0	30	[	5B
<ACK>	06	1	31	\	5C
<BEL>	07	2	32	]	5D
<BS>	08	3	33	^	5E
<HAT>	09	4	34	_	5F
<LF>	0A	5	35	`	60
<VT>	0B	6	36	a	61
<FF>	0C	7	37	b	62
<CR>	0D	8	38	c	63
<SO>	0E	9	39	d	64
<SI>	0F	:	3A	e	65
<DLE>	10	;	3B	f	66
<DC1>	11	<	3C	g	67
<DC2>	12	=	3D	h	68
<DC3>	13	>	3E	i	69
<DC4>	14	?	3F	j	6A
<NAK>	15	@	40	k	6B
<SYN>	16	A	41	l	6C
<ETB>	17	B	42	m	6D
<CAN>	18	C	43	n	6E
	19	D	44	o	6F
<SUB>	1A	E	45	p	70
<ESC>	1B	F	46	q	71
<FS>	1C	G	47	r	72
<GS>	1D	H	48	s	73
<RS>	1E	I	49	t	74
<US>	1F	J	4A	u	75
<Space>	20	K	4B	v	76
!	21	L	4C	w	77
``	22	M	4D	x	78
#	23	N	4E	y	79
\$	24	O	4F	z	7A
%	25	P	50	{	7B
&	26	Q	51		7C
`	27	R	52	}	7D
(	28	S	53	~	7E
)	29	T	54	Delete	7F
*	2A	U	55		

7.2. Release overview

All release are compatible to each other within a block.
The current release is written in bold letters in each case.

PC-Version	Date	Firmware-Version		
		MAIN	Dome	notes
V1.0	16/10/2006	• 1.00	• 1.00	
V1.10	19/10/2006	• 1.05	• 1.02	
	03/11/2006	• 1.06		
V1.11	13/11/2006	• 1.07		

Upgrade-Instruction

Sequence of upgrading:

1. Installing new PC-software (please uninstall the old version first using Windows *System/Software*)
2. Programming firmware *Mainrxx.bin* for main cpu .
3. Programming firmware *Domexx.bin* for the interface controller.

The programming is performed as described in menu *Service functions* (page 23).

Important:

After upgrading the unit the settings of the EDM-40 have to be configured by the new PC-program anew.

8.0 Safety Instructions

Observe the following safety instructions for your own safety and to fulfill the device and EMC specifications :

1. Keep the device away from heat sources and direct sun light.
2. Protect the device and the power supply from moisture to avoid the risk of electrical shock and fire.
3. If fluids have penetrated the device, immediately pull the power plug and have the device inspected by an authorized dealer.
4. Do not insert any objects into the device.
5. Never attempt to open the device yourself.
6. Do not subject the device to unusual strain such as strong vibrations and shocks.



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